Sanitized Copy Approved for Release 2010/03/05 : CIA-RDP85T00875R00170002

Doc/SER

CIA/OER/IM 71-227

25X1

Secret

DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

Communist China: Expansion of the Iron and Steel Industry 1966-71

Secret
ER IM 71-227
December 1971

Copy No 58

WARNING

This document contains information affecting the national defense of the United States, within the meaning of Title 18, sections 793 and 794, of the US Code, as amended. Its transmission or revelation of its contents to or receipt by an unauthorized person is prohibited by law.

Sanitized Copy Approved for Release 2010/03/05 : CIA-RDP85T00875R001700020080-0

CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
December 1971

INTELLIGENCE MEMORANDUM

COMMUNIST CHINA: EXPANSION OF THE IRON AND STEEL INDUSTRY 1966-71

Summary

1. Communist China has carried out a vigorous expansion and upgrading of its iron and steel industry over the past six years. As a result, production of crude steel in 1971 will be about 20 million metric tons, compared with about 18 million tons in 1970 and 11 million tons in 1965. China has moved up ahead of Italy to seventh spot among world steel producers.

2. Most of China's steel is produced in large centrally controlled plants. Of these the old plant at An-shan in Northeast China is the largest and produces nearly one-third of the nation's steel. Plants at Wu-han, Pao-t'ou, and Shanghai together presently account for another third. Most of the remainder is produced by other large or medium-sized plants. Small plants, dependent on local resources, produce less than one-tenth of the total and serve to meet the demands of local industry for minor steel products such as angle iron and foundry pig.

3. The geographical center of China's iron and steel industry, originally in the northeast, has continued to shift inland and toward the south during the past six years. The principal factors in this shift have been the discovery of new deposits of raw materials, a renewed effort to industrialize hinterland areas, and a policy of strategic dispersal of basic industry.

4. China's reserves of iron ore and coking coal seem adequate to support considerable further growth of the steel industry. Nonetheless,

---

Note: This memorandum was prepared by the Office of Economic Research and coordinated within CIA.

investment in iron ore mining and beneficiation must be boosted to keep up with the continual commissioning of new blast furnaces. Blast furnace output already is lagging behind the needs of the steel furnaces, and in 1971 China has imported more than one-half million tons of pig iron to keep its steel furnaces operating.

5. China is both producing and importing steelmaking equipment. The domestic machine building industry manufactures ordinary furnaces and rolling equipment. Imports from Japan and Western Europe are relied on for advanced equipment such as consumable electrode vacuum furnaces for making superalloys; cold rolling mills; equipment for plating, annealing, tempering, and grain-orienting sheet steel; and large air reduction plants for producing oxygen for basic oxygen furnaces.

6. The output of China's iron and steel industry consists mainly of basic products such as structural steel, reinforcing rod, rail, wire products, plate, hot-rolled sheet, and carbon steel tubing. In addition, the industry turns out small amounts of high-grade products including stainless sheet, low-alloy shapes, tinplate, superalloy steel, and high-speed tool steel.

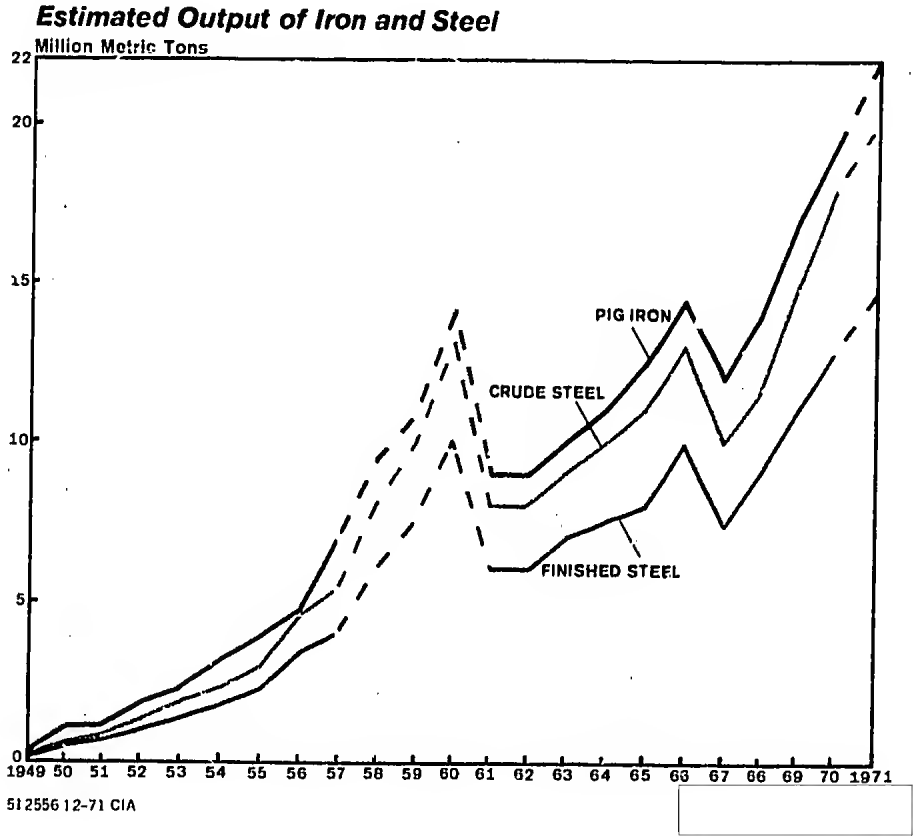
7. In 1970, China imported about 2 million tons of steel, primarily the special types of flat-rolled products and tubing for which domestic production is inadequate. As for exports, China shipped small amounts of common grades of steel to less developed countries, principally those receiving China's economic assistance.

8. The most serious problems of the steel industry are caused by the uneven growth of the various stages of production and can be ameliorated by adjustments in the allocation of investment. Although details on the Fourth Five-Year Plan (1971-75) have not been released, the plan clearly must call for continued rapid expansion of capacity for producing both iron and steel products and steelmaking equipment, as well as supplementary imports of equipment, technology, and specialty steels from Japan and Western Europe. A larger volume and assortment of steel products are essential to China's basic plan for the priority growth of military-industrial strength.

Discussion

Recent Growth in Perspective

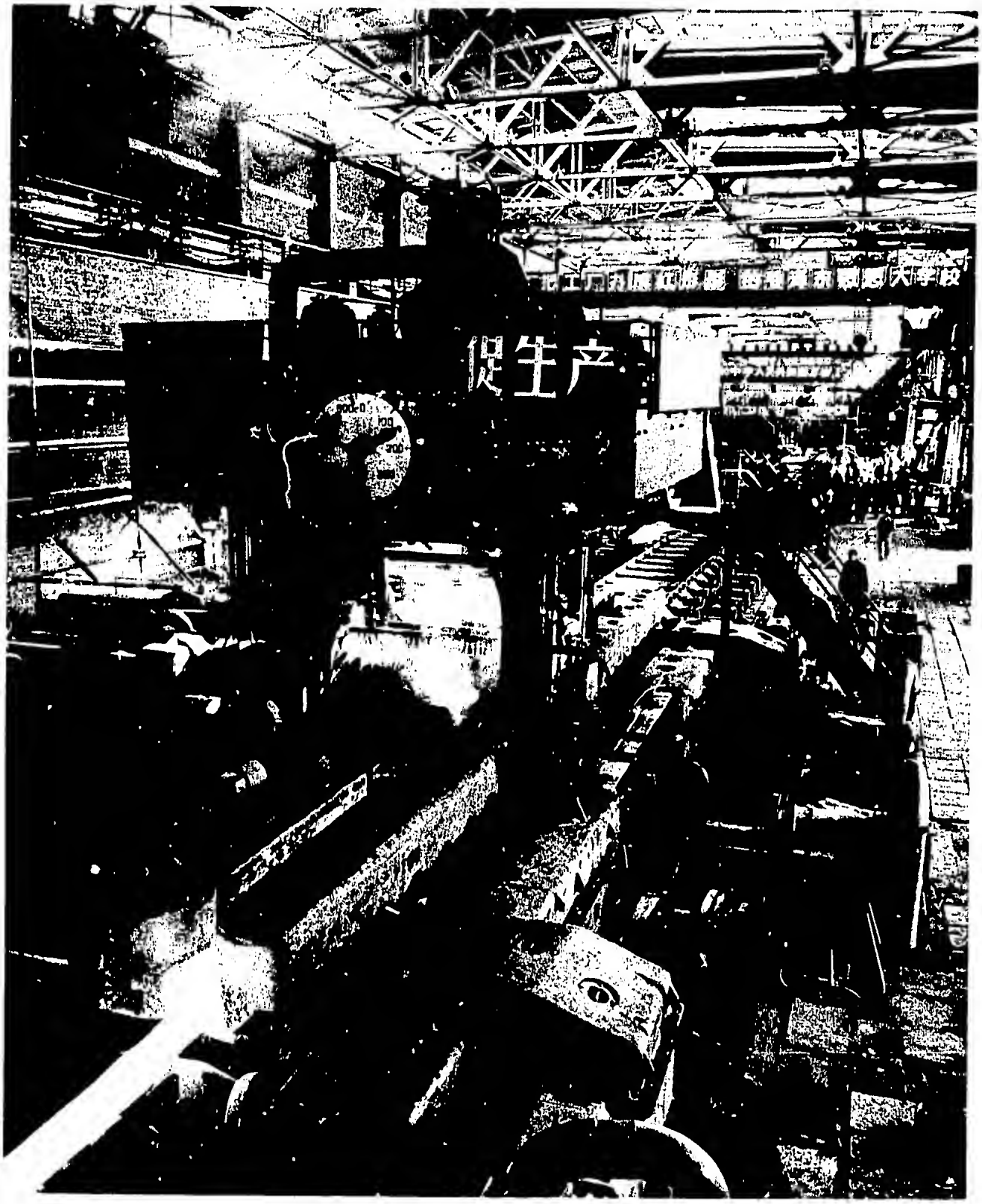
9. When the Communists came to power in China in 1949, they immediately set to work restoring and expanding the iron and steel industry as a first step toward industrializing the mainland economy. As indicated in the Chart, the orderly development of the industry gave way in 1958-60



25X1

to the frenzied production campaigns of the Great Leap Forward, when explosive but unsustainable increases were obtained. In 1960, the final year of the Leap, China's major plants produced twice as much pig iron and 2-1/2 times as much crude and finished steel as in 1957.[1] Moreover, in

1. Pig iron is produced in blast furnaces and is used as an input to cast iron foundries and steelmaking furnaces. Crude steel is made from pig iron and scrap and is usually measured in the ladle before being cast into ingots and billets. Finished steel is steel that has been rolled, drawn, cast, or extruded into the shape in which it is to be used in manufacturing and construction.



Large-scale production at a major facility: new blooming mill goes into operation at the Shih-ching-shan Iron and Steel Company near Peking (September 1969).

1960 the hundreds of thousands of primitive "backyard" furnaces built during the Leap turned out as much pig iron and nearly half as much crude steel as did the major plants. Much of the "backyard" product was unusable, however, and the overworking of both manpower and machinery in the major steel plants and iron mines gravely damaged the capacity of the industry.

10. The principal factors causing the steep decline in iron and steel production in 1961 were the accelerated wear of equipment resulting from overly intensive use and neglected maintenance, the withdrawal of Soviet technical assistance in mid-1960, and the closing of the ill-conceived "backyard" furnaces. China's iron and steel industry entered a prolonged slump; production at the major plants did not regain the 1960 levels until 1966. Another, briefer downturn hit the industry in 1967-68, when the turmoil of the Cultural Revolution disrupted operations at An-shan and other major iron and steel plants for weeks or even months at a time.

11. Recovery from the Cultural Revolution was remarkably fast, and new record levels of production were achieved in 1969 and again in 1970. The industry has turned in another strong performance in 1971, the first year of the Fourth Five-Year Plan. Production in 1971 is expected to register all-time highs of 22 million tons of pig iron, 20 million tons of crude steel, and 14.5 million tons of finished steel.(2)

12. The impressive progress of the past few years has resulted from a program of:

- expanding capacity at major plants and building new facilities.
- re-establishing the most promising of the small- scale iron and steel facilities that use local materials; and
- generally upgrading the industry by installing modern production equipment, establishing appropriate repair and maintenance cycles, and improving the quality and assortment of products.

These developments are discussed below.

2. Compared to estimates for 1970, these figures represent increases of 13%, 11%, and 12%, respectively. In September 1971 the Chinese claimed that increases in these three items for the first eight months of 1971 compared with the first eight months of 1970 were 22%, 19.6%, and 19.1%, respectively, but official comparisons for part of a year are apt to be abnormally inflated.

Large-scale production at a major facility: a large [illegible] plant.

Large-scale production at a major facility: mining iron ore with 30-ton and 45-ton quarry trucks and electric shovels.

Program for Increasing Capacity

13. Despite the upheavals of the Cultural Revolution, the Chinese successfully carried out a substantial and relatively steady expansion of the iron and steel industry during 1966-70. As shown by the following estimates, China's annual capacity for producing pig iron rose by more than one-third, crude steel by roughly one-half, and finished steel by about two-thirds:

	Million Metric Tons	
	Year-End 1965	Year-End 1970
Pig iron	16	21.5 - 23
Crude steel	14	20.5 - 22
Finished steel	9 - 10	15 - 17

Additional capacity, amounting to several million tons of pig iron and steel, has been under construction, and a considerable, if as yet unquantifiable, amount of this capacity almost certainly has come into operation in 1971.

14. Nearly all of the new capacity has been added at large or medium-sized facilities controlled by the central government. Small-scale facilities are on the increase, however, and promise to aid materially in the next few years in Peking's goal of developing small "locally self-reliant" industrial bases in China's vast hinterland. The locations of the 10 largest iron and steel facilities are shown on the Map. Total capacity for producing pig iron and crude steel at year-end 1970 from the different sized plants is estimated as follows:

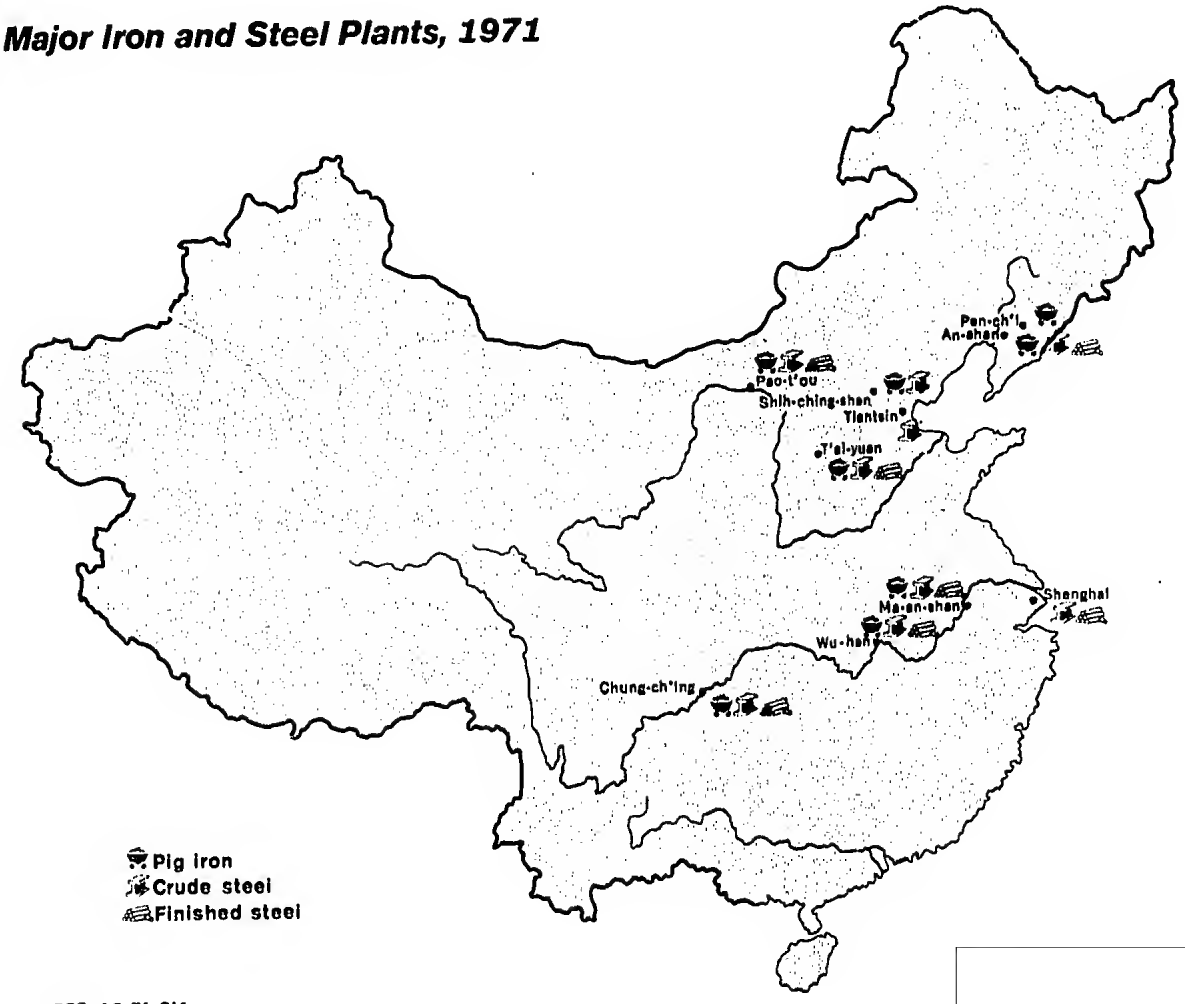
	Million Metric Tons [a]	
	Pig Iron	Crude Steel
An-shan	5.5	6
Wu-han	2.5	2.5
Pao-t'ou	1.5	2
Shanghai plants	b/	2.5
Other medium and large plants	10.5 - 11.5	6 - 7
Total medium and large plants	20 - 21	19 - 20
Local plants	1.5 - 2.0	1.5 - 2.0
Total	*21.5 - 23.0*	*20.5 - 22.0*

a. Rounded to the nearest 500,000 tons.
b. Less than 250,000 tons.

Modern technology at a local steel plant: general view of integrated plant.

Modern technology at a local steel plant: electric furnace in background; charging molten pig iron into top-blown oxygen converter (BOF) in foreground.

Major Iron and Steel Plants, 1971



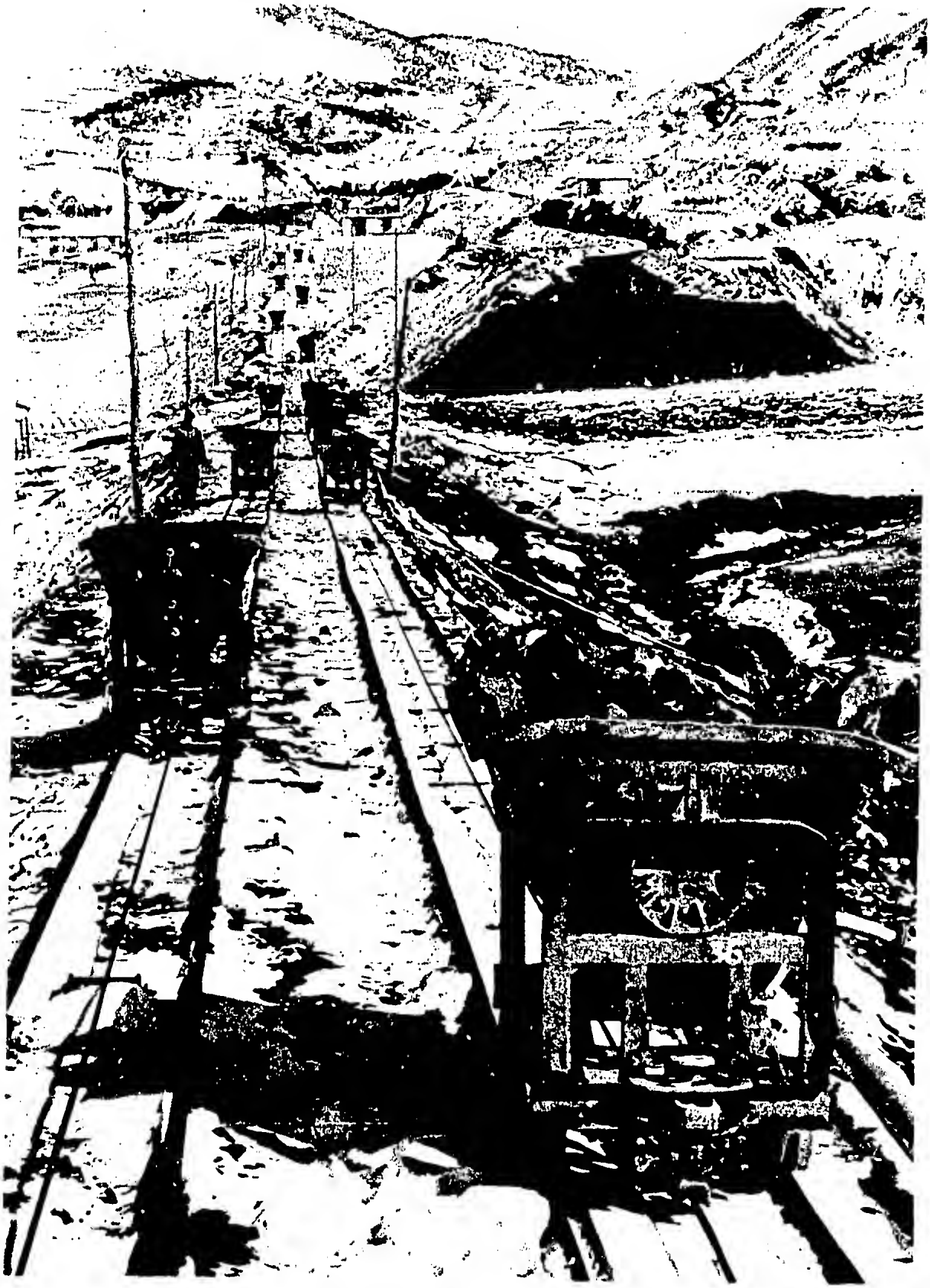
512555 12-71 CIA

25X1

New Capacity at Major Facilities

15. An-shan was China's first major steel plant and has long been its largest. However, little new capacity has been added to An-shan in recent years, probably because it is fully taxing the supplies of raw materials available in Northeast China and because Peking wants capacity to be dispersed. Consequently, as the industry expanded elsewhere, An-shan's share of total capacity declined steadily from nearly one-half at the end of 1958 to less than one-third at the end of 1970.

16. Both the Wu-han and the Pao-t'ou Iron and Steel Plants, which are near large coal and ore reserves, are intended eventually to be giant complexes like An-shan. Wu-han and Pao-t'ou together received about one-third of China's investment in ferrous metallurgy during 1966-71. Two large blast furnaces, each with an annual capacity of 850,000 tons of pig



Modern technology at a local steel plant: cable cars transport ore from mine.

iron, were built at Wu-han in 1969 and 1970. Wu-han's crude steel capacity was increased to about 2.5 million tons per year by the addition of a new 500-ton per heat (350,000 tons per year) open-hearth furnace (OHF) and a new basic oxygen furnace (BOF)[3] with a 250,000-ton per year capacity. Moreover, a rolling mill for rails and structural shapes and a hot sheet mill with a combined capacity of 1.5 million tons were installed.

17. Pao-t'ou has added several steelmaking furnaces, including two BOFs in 1970. A bottleneck at the blooming mill has been removed by importing ingot soaking pits from Japan to augment those imported in the 1950s from the USSR. A large tube mill apparently went into production after 1965, and a rail/structural rolling mill of Soviet design with an annual capacity of 1.5 million tons appears to have been completed in late 1968. Moreover, a new blast furnace which might raise pig iron capacity by one-third from more than 1.5 million tons to a total of about 2.5 million tons is under construction.

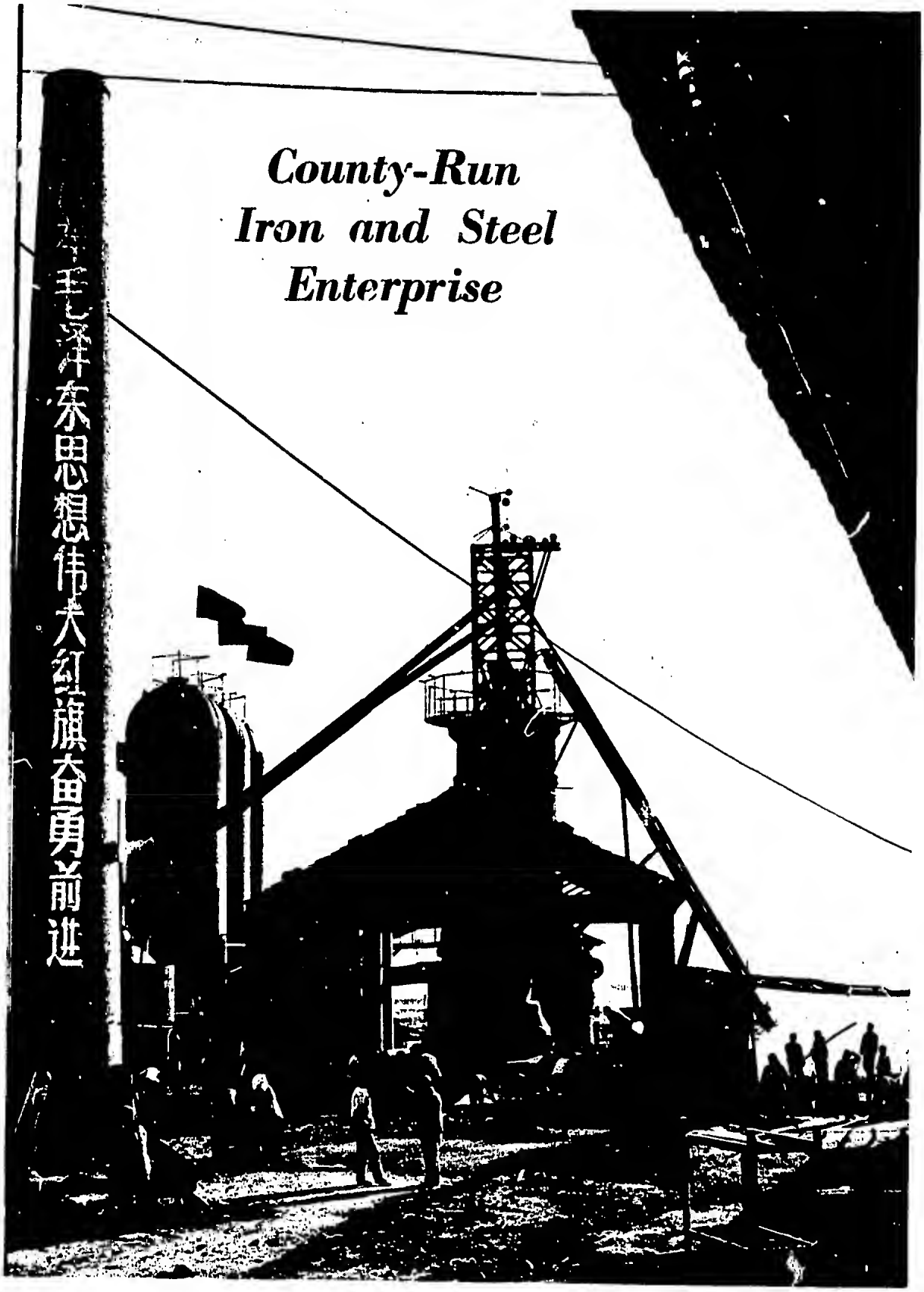
18. At the Shanghai iron and steel complex, the recent addition of several BOFs will bring crude steel capacity into better balance with steel rolling capacity. Nonetheless, Shanghai apparently will remain dependent on outside sources for pig iron. At the T'ai-yuan Iron and Steel Plant, the steelmaking and rolling capacity both have been expanded since 1965, mainly with West European assistance, making this plant one of China's major producers. The Shih-ching-shan Iron and Steel Plant also has been expanded substantially in recent years.

19. The discovery of major deposits of iron ore and coal in southwestern China in the Szechwan-Yunnan area suggests that a major iron and steel center may be developed in that region before long. The pattern of investment is shifting the center of gravity of China's iron and steel industry – inland and southward from the original northeastern location.

Local Plant Programs

20. Since 1966 the government has backed a program for the production of iron and steel in widely distributed small plants that use local coal, iron ore, and labor. This is a renewal of the Leap Forward program for "walking on two legs" – i.e., developing both centrally controlled large-scale industry and small-scale industry that exploits local resources and initiative. However, in distinction to the unsuccessful earlier program, the new program appears to give more careful thought to the selection of sites where adequate supplies of good-quality ore and coal justify local industrialization. Furthermore, the amount of labor involved

3. The term basic oxygen furnace (BOF) designates a top-blown oxygen converter.



Primitive technology at a local steel plant: blast furnace operations.

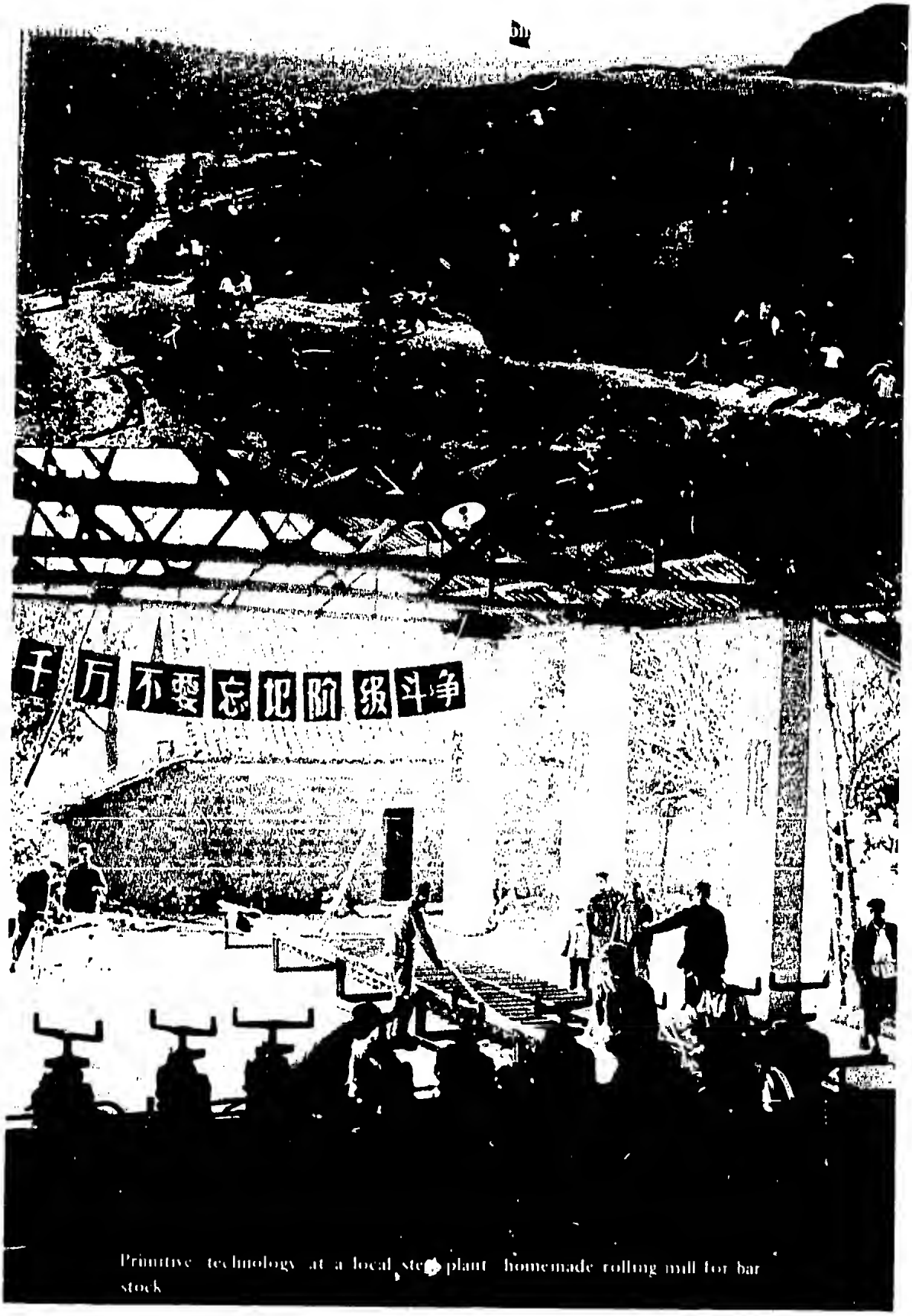
is only a fraction of the Leap Forward endeavor and is not decimating the agricultural labor force.

21. Recently developed processes for steel production in the industrialized countries are well adapted to efficient small-scale production of steel and have been adopted by China for some local plants. These processes employ the BOF and the continuous casting technique for producing billets. Small BOFs can produce sizable amounts of crude steel because the process permits a large number of heats per furnace per day. Continuous casting obviates the need for ingot molds, ingot soaking pits, and blooming mills. Moreover, the BOF, because it provides molten steel at frequent intervals, is well suited to serving a continuous casting machine. About 40 small and medium-size Chinese steel plants now operate BOFs, and at least one small plant at Yen-t'ai operates a continuous casting machine on the very small scale of about 10,000 tons of billets per year. These billets are of small cross section, appropriately sized for rolling into light structural steel such as angles, bars, and small channels.

22. The local plant program will result in widely distributed facilities able to produce, in addition to pig iron and steel for castings, a supply of light rolled products for turning out agricultural and other light machinery. The program may eventually permit the large steel plants to concentrate on meeting the requirements of centrally planned industrial priorities. Furthermore, local production of steel reduces transportation expenditures and permits the formation of a system of widely dispersed, self-sufficient machine building centers less vulnerable to war or natural disaster.

Improvements in Technical Levels

23. Most of the rolling mills established by China since 1965 have been rail/structural or plate/sheet mills. China has also either built or imported from Japan and Western Europe several cold strip, rod, and tubing mills and has thereby widened the available assortment of finished steel products. Most of the crude steel capacity added since 1965 has consisted of basic oxygen converters, now the highest state of the art in industrialized countries. The few open-hearth furnaces installed since 1965 are probably those provided for initially under Soviet aegis. Blast furnace practice likewise has been improved with the construction of larger, more efficient furnaces and the injection of powdered coal and increased blowing pressure to raise furnace temperature and thereby output. Moreover, the extensive use of sintered or pelletized ore has increased the metal content of the charge and reduced the amount of coke needed to produce a unit of pig iron.



Primitive technology at a local steel plant: homemade rolling mill for bar stock

Supply Problems

Capital Equipment

24. China's machine building industry is not yet able to provide all the steelfinishing equipment needed for a modern assortment of steel products. A particularly serious deficiency in domestic production is the inability to produce (a) wide continuous hot strip mills (b) equipment for cold rolling thin gage sheet steel, and (c) equipment for plating, galvanizing, annealing, tempering, and grain-orienting sheet steel.

25. In 1965, China began a major program to import modern steel production equipment from non-Communist countries, concentrating on complex rolling mills, heat treating furnaces, furnaces for making specialty steels, and air separation plants.(4) During 1965-67, China bought steel production equipment worth nearly $100 million from Japan and Western Europe (see Table 2).(5) However, the shipment and installation of this equipment were delayed by the Cultural Revolution and by protracted negotiations and disputes with Western suppliers. Moreover, an effort to purchase additional rolling mill equipment worth nearly $150 million from a consortium of West European firms failed in the mid-1960s when their respective governments refused to grant export licenses.

Raw Materials

26. The expansion of iron ore mining has become one of China's most serious supply problems. The mining sector has been hard pressed to keep up with the rapid growth of iron and steel production. The anticipated commissioning of large blast furnaces now under construction lends urgency to the need for additional investment in iron ore mining.

27. Early in 1971, the Chinese disclosed the seriousness of the supply problem in a campaign of articles and broadcasts urging greater efforts to extract ore and collect scrap. A high priority has been assigned to both the fuller exploitation of existing iron ore mines and the development of major new deposits. As a result of the speed-up, ores of lower grade are arriving at the mills and impairing blast furnace efficiency. The Chinese press claims a 48% increase in iron ore extraction in 1970 compared with 1969. This figure is no doubt an exaggeration and, moreover, is a reflection of the lower average iron content of the ore. This 48% claim hardly squares with (a) the estimate that in the same period blast furnace production rose only 16%, and (b) reports of shortages of ore at Wu-han.

4. These plants produce oxygen for steel furnaces and blast furnaces.
5. Tables 1 through 3 are in the Appendix.

28. Despite mass drives to collect more scrap and to exploit mineral resources more quickly and fully, the Chinese have had to import scrap to satisfy the requirements of the iron and steel industry. China's relatively young industrial sector does not yet generate substantial amounts of scrap iron, and consequently more pig iron must be charged into the steel furnaces than is the practice in steel industries of the developed countries. Imports of scrap in 1971, probably totaling more than 225,000 tons (exclusive of ships purchased for demolition), will be about double those in 1970 (see Table 3).

29. China's iron and steel industry is now sufficiently mature to rapidly recruit and train large numbers of new workers. Short training courses and on-the-job experience are adequate for the majority of the new workers. When a new plant is commissioned, a cadre of trained workers from an existing plant is dispatched to get the new plant started. Women apparently are assigned to practically all jobs, including such jobs as crane operators and plant engineers.

30. Wages in steel as a branch of heavy industry are moderately higher than in light industry. Like all industrial wages, steel wages have at best only held their own since the start of the Cultural Revolution in 1966. The government claims that welfare benefits have been rising steadily and exhorts the workers to produce "more and better" for Mao and the motherland. So far as is known, wage grumbles have not had an appreciable impact on worker efficiency in the industry.

Product Assortment

Domestic Production

31. China currently is able to produce a broad assortment of finished steel products. Large-scale production is largely limited to ordinary products such as structural steel, rails, wire products, seamless and welded tubing, medium plates, and sheets. China also can produce small quantities of a variety of special steel products, including silicon steel sheets, cold-rolled strip and sheet, low-alloy shapes and tubes, stainless steel, tinplate, railway wheels, superalloys, and high-speed tool steels.

32. China's specialty steel products have come into production in recent years for the most part, and output is well below domestic requirements for most items. China produces silicon steel sheet for the heavy electrical industry, although not the grain-oriented type needed for low-core-loss transformers. The production of low-alloy steel has been increasing in recent years and has been useful in improving the strength and lightness of machines and structures.

33. Since about 1967, China has developed a capability for producing small amounts of superalloys for aircraft engines, aerospace vehicles, and other technologically advanced products. Consumable electrode vacuum furnaces imported from Japan and electron beam smelting equipment from East Germany probably have enhanced China's production of these alloys. However, overall domestic production is not yet large enough to satisfy all of China's requirements.

Imported Products

34. China's principal steel imports are sheet, plate, tubing, and alloy steels in the form of sheets, shapes, and tubes. Despite continual efforts to extend self-reliance, the iron and steel industry remained nearly as dependent upon imports in the late 1960s as in the late 1950s. Following a contraction of from over 1.6 million tons in 1958 to less than 200,000 tons in 1962, imports rose steadily to about 2 million tons in 1970 (see Table 3). During the past decade, China has consistently imported about 15% of its steel requirements.

35. China's iron and steel production contains a high proportion of pig iron. As mentioned earlier, China needs more pig iron than the world's other large steel producers because it has so little scrap to charge into the steel furnaces. Until 1970, China had surplus pig iron to export. Exports of pig iron reached a peak of about 1.25 million tons in 1964 and declined steadily thereafter (see Table 3). Now China imports pig iron in substantial quantities.

Exported Products

36. China has established a small but stable market in the less developed countries for its sheet, structural steel, and other basic steel mill products. These exports, which have amounted to between 200,000 and 300,000 tons annually since the mid-1950s, go to Albania, Malaysia, Singapore, Egypt, Pakistan, and other Asian and African countries.

Prospects

Capacity and Output

37. The need to continue to expand and improve the iron and steel industry in the 1970s was underscored recently by a group in the Chinese Ministry of the Metallurgical Industry. Writing in the **People's Daily** of 12 May 1971,[6] these spokesmen denounced an alleged overallocation of

6. As reported in **China Mainland Press**, SCMP 71-21, May 1971, p. 64-75.

investment to the electronics industry in the past and reaffirmed the Maoist rule of "steel as the key link" in fulfilling China's goal of broad-based industrialization.(7) Heavy emphasis was placed on developing a better balance between iron ore mining and steel processing, a greater variety of finished steel products, and a more "strategic disposition" of iron and steel facilities. The curious juxtaposition of steel and electronics may reflect a controversy at top levels over how much of China's growing industrial resources should go to (a) an immediate acceleration of the production of complex military equipment at the expense of basic economic growth, or (b) an emphasis on broadening and deepening of the basic industrial investment, perhaps coupled with a new push toward agricultural mechanization.

38. The need for iron and steel will grow rapidly during the remainder of the Fourth Five-Year Plan (1971-75). Large-scale industrial and defense construction projects are in progress throughout the country, both in established industrial areas and in new remote locations. The machine building industries are expanding output of a variety of machine tools, trucks, railroad equipment, and armaments. A substantial expansion of the transportation network is under way. So much of this effort is in remote frontier areas and/or in difficult terrain, that the demand for steel for rails, bridges, and heavy construction equipment is especially strong. Moreover, agriculture's mushrooming requirements for iron and steel are continually reiterated in the Chinese press.

39. China's iron and steel industry can produce most of the steel products needed by these industries – rails, structurals, castings, plates and sheets, tubing, and some alloys. Ordinary carbon steel suffices in most applications. However, stainless sheet is required in jet engines and chemical equipment; electrical generators and transformers perform best when built with cold-rolled, grain-oriented silicon sheet; precision ball bearing races are made from special tubing; and high-strength steels are needed in vehicles and many types of conventional and advanced weapons. China has a small but growing capacity to produce special steels; for some time to come it will remain heavily dependent on foreign supplies. Similarly, the Chinese will produce domestically most of the equipment for making ordinary steel but will continue to import from Japan and Western Europe much of the more complex metallurgical equipment for making special steels, as well as the modern high-speed sheet and strip mills.

7. Similar criticism was voiced by the "revolutionary mass criticism writing group" of the electronics industry itself (presumably the Fourth Ministry of Machine Building) in the 12 August 1971 issue of the **People's Daily**, as reported in **FBIS Daily Report: People's Republic of China**, 18 August 1971, p. B-8-14.

40. Although the shortage of pig iron is worsening in 1971, the completion of several large blast furnaces and greater investment in iron ore mining will alleviate this problem. In any case, China appears committed to the expenditure of foreign exchange for necessary imports of pig iron. The many steelmaking furnaces and rolling mills already completed and others that should be finished in late 1971 or 1972 will permit a substantial increase in the output of crude and finished steel. An additional potential for expansion lies in improving the operating efficiency of furnaces and mills.

41. The local plants present only minor opportunities for expansion of steel output. It is reasonable to assume that only localities with adequate coal and iron ore resources will be allowed to engage in iron and steel production and that further opportunity to expand the local program is slight. Local plants presently produce several times as much pig iron as finished steel, and their continued development is likely to stress the installation of small rolling mills. These will do little to solve the steel supply problems of China's major machine building plants. On the other hand, the local plants are significant suppliers of pig iron to the major steel plants.

42. From 1957 through 1970, output of crude steel has more than tripled and the average annual rate of growth has been 10%. Although details of the new Fourth Five-Year Plan have not been released, the continued rapid growth in the capacity and output of the iron and steel industry and its equipment suppliers is clearly part of the plan. To judge from already known investment activities, the target for 1975 could lie in the range of 25 million to 30 million tons.

International Ranking

43. Prospects for China to move up in rank among the world's major steel producers in the 1970s look good. In 1970 the ten leading steel producing countries ranked as follows in crude steel output:

	Million Metric Tons		Million Metric Tons
United States	119	France	24
USSR	116	China	18
Japan	93	Italy	17
West Germany	45	Poland	12
United Kingdom	28	Czechoslovakia	11

Thus, China has already passed Italy in crude steel production and is rapidly gaining on France and the United Kingdom.

44. Although China is the equal of Italy in annual tonnage of crude steel, they cannot be compared in product mix and production efficiency. Italy's machine building industries must compete for business in the sophisticated markets of the industrialized countries and must operate at the highest state of the art. Its machine building output is heavily weighted by such products as consumer durables, motor vehicles, office machinery, modern machine tools, chemical and refining equipment, and many kinds of precision equipment. These products incorporate large amounts of cold-rolled sheet and strip and alloy and stainless sheet, plate, and bar stock. China's steel assortment is very short in sheet and strip of all kinds and is heavily weighted in plate and structural shapes. In market terms, Italy's steel product is probably more valuable than China's. However, China's assortment suits most of China's basic needs.

Use of Labor

45. In few other countries could steel producers use labor as lavishly as China does.[8] The rationale for the local plant program requires labor to be a very cheap and plentiful input compared with capital. The labor-intensive methods of mining iron ore and making iron and steel are clearly apparent in the photographs. The cost to the Chinese economy of such work methods is probably slight and brings about a reduction in the hidden unemployment of the rural population. At the same time that China's steel industry makes optimum use of labor-intensive methods on a local level, it is incorporating new technology into the equipment of both its major plants and its small local plants. It can be expected that China will employ the BOF and the continuous casting process in the further expansion of the steel industry at the same time that many ancillary tasks will remain unmechanized. Moreover, China can be expected to expand its assortment of steel products to alleviate its dependence on imports of strategic specialty steels.

8. India with a surplus population and large amounts of both visible and hidden unemployment would be an exception to this statement.

APPENDIX

Statistical Tables

Table 1

Communist China: Estimated Output of Pig Iron, Crude Steel, and Finished Steel

Million Metric Tons

Year	Pig Iron	Crude Steel	Finished Steel
1952	1.9	1.35	1.0
1957	7.0	5.35	4.0
1958	9.5 a/	8.0 a/	6.0 a/
1959	10.9 a/	10.0 a/	7.5 a/
1960	14.1 a/	13.0 a/	10.0 a/
1961	9.0	8.0	6.0
1962	9.0	8.0	6.0
1963	10.0	9.0	7.0
1964	11.0	10.0	7.5
1965	12.5	11.0	8.0
1966	14.5	13.0	10.0
1967	12.0	10.0	7.5
1968	14.0	11.5	9.0
1969	17.0	15.0	11.0
1970	19.5	18.0	13.0
1971	22.0	20.0	14.5

a. Output of major plants only. Does not include an unknown amount of product of the so-called "backyard furnaces" which was of low quality, and, for the most part, usable only by primitive local industry.

Table 2

Communist China: Major Imports of Machinery and Equipment for the Iron and Steel Industry 1964-70

Description	Date of Contract	Supplying Country	Value (Million US $)	Comments
Ore Preparation Equipment				
Cooling equipment for an iron ore sintering plant	1965	Japan	0.4	Probably delivered to Wu-han in 1966.
Iron ore pelletizing plant	1966	Japan	3.3	Capacity of 1.1 million tons.
Steelmaking Equipment				
Three electric vacuum furnaces	1965	Japan	0.5	Possibly for processing steel alloys.
Vacuum arc furnace	1965	Japan	0.3	5-ton capacity. Delivered in 1966. Used to produce high-purity alloy steels and refractory metals.
Arc furnace	1965	Sweden	1.0	
Two basic oxygen furnaces	1965	Austria	13.4	Capacity of 600,000 tons. Delivered to T'ai-yuan.
Vacuum arc furnace	1966	Japan	0.6	4-1/2-ton capacity. Delivered in 1968.
Air Separation Plants				
Air separation plant	1964	Japan	1.7	Delivered to Shih-ching-shan in 1965 or 1966.
Air separation plant	1965	West Germany	3.3	Delivered to T'ai-yuan for the Austrian BOFs.
Air separation plant	1967	Japan	0.5	Delivered to 1969-70.

Table 2

Communist China: Major Imports of Machinery and Equipment for the Iron and Steel Industry 1964-70 (Continued)

Description	Date of Contract	Supplying Country	Value (Million US $)	Comments
Two air separation plants	1967	Japan	N.A.	
Four air separation plants	1967	Japan	2.2	
Air separation plant	1969	Japan	N.A.	
Air separation plant	1970	France	2	To be supplied by the Japanese affiliate of a French company.
Air separation plant	1970	West Germany	N.A.	Contract apparently signed in late 1970.
Steelshaping Equipment				
Bar and wire rod mill	1965	Japan	4.9	Capacity of 68,000 tons.
Seamless tube expanding mill	1965	Italy	3.6	Capacity of 50,000 tons. Delivered to Shih-ching-shan.
Cold-strip steel rolling mill	1965	West Germany	11.5	Capacity of 80,000 to 100,000 tons. Delivered to T'ai-yuan.
Two 20-cluster sheet rolling mills	1965	West Germany	2.5	Delivered in 1966-68.
20-cluster temper mill	1965	West Germany	16.0	Delivered to T'ai-yuan in 1966-68.
Steel degassing plant	1965	West Germany	0.3	Delivered in 1966.
Rod and tube extrusion press	1966	West Germany	3.2	

Table 2

Communist China: Major Imports of Machinery and Equipment for the Iron and Steel Industry 1964-70 (Continued)

Description	Date of Contract	Supplying Country	Value (Million US $)	Comments
Tube mill	1966	West Germany	6.0	For rolling stainless steel.
Steel extrusion press	1966	West Germany	4.8	
Steel extrusion press	1966	Japan	N.A.	
Vacuum annealing furnace	1966	Japan	0.3	For treatment of stainless steel.
Soaking pit	1966	Japan	N.A.	Delivered to Pao-t'ou.
Heat treating furnace	1967	Japan	1.2	For use in rolling stainless steel.
Two vacuum annealing furnaces	1968	Japan	0.5	Possibly delivered in 1969.
Seamless steel pipe plant	1970	Japan	2.5	
Vacuum annealing furnace	1970	Japan	N.A.	Reportedly the "world's longest."

Table 3

Communist China: Trade in Finished Steel, Pig Iron, and Scrap

Thousand Metric Tons

Year	Finished Steel Imports	Pig Iron		Scrap a/ Imports
		Exports	Imports	
1955	870	646	0	-
1956	756	600	0	-
1957	529	203	0	-
1958	1,645	175	0	-
1959	732	169	0	-
1960	778	221	0	-
1961	231	228	0	-
1962	186	176	0	-
1963	232	292	0	-
1964	371	1,261	0	-
1965	722	597	0	2
1966	1,289	539	0	29
1967	1,605	231	0	341
1968	1,671	47	1	74
1969	1,772	4	4	128
1970 b/	2,000	N.A.	32	114
1971	N.A.	N.A.	535 c/	226 c/

a. Excludes ships imported for demolition. Relatively small amounts of scrap were imported from 1955 to 1964.
b. Preliminary.
c. Minimum total of shipments and contracts.